WHAT IS CLAIMED IS:

1. A projection lens system for enlarging and displaying an original image displayed on an image generating source on a screen, comprising a first lens group including a meniscus lens having positive refractive power in which the profile of the central area thereof is convex on the screen side, a second lens group including a lens having weak positive refractive power in which the profile of the central area thereof has a convex lens surface on the image generating source side, a third lens group including a lens having strong positive refractive power, a fourth lens group including a lens having negative refractive power and a concave lens surface on the screen side, a fifth lens group including a lens having weak refractive power in which the profile of the central area thereof has a convex lens surface on the image generating source side, and a sixth lens group including a lens having a concave lens surface on the screen side and negative refractive power sequentially from the screen side.

2. A projection lens system according to Claim 1, wherein said first lens group and said second lens group have the following relation of an axial distance between surfaces of lens L 12 to a focal length f0 of

the overall projection lens system:

$$(L\ 12\ /\ f0) < 0.25$$

3. A projection lens system according to Claim 1, wherein said first lens group, said second lens group, and said third lens group have the following relation between said axial distance between surfaces of lens L 12 of said first lens group and said second lens group and an axial distance between surfaces of lens L 23 of said second lens group and said third lens group:

$$(L\ 12\ /\ L\ 23) > 1.3$$

4. A projection lens system according to Claim 1, wherein said third lens group has the following relation between a radius of curvature Ra3 of the lens surface of a lens having strongest positive refractive power on the screen side among the lenses thereof and a radius of curvature Rb3 of the lens surface on the image generating source side:

$$|Ra3| < |Rb3|$$

5. A projection lens system according to Claim 1, wherein said fourth lens group has the following relation between a radius of curvature Ra4 of the lens surface of a lens having strongest negative refractive power on the screen side among the lenses thereof and a radius of curvature Rb4 of the lens surface on the image generating source side:

$$|Ra4| < |Rb4|$$

6. A projection lens system according to Claim 5, wherein said fourth lens group uses a high dispersion material having an Abbe's number d of 45 or less as a material of said lens having strongest negative refractive power among the lenses thereof.

7. A projection lens system according to Claim 5, wherein a refractive index n3 of said lens having strongest positive refractive power among the lenses constituting said third lens group and a refractive index n4 of a lens closest to said third lens group among the lenses constituting said fourth lens group are almost equal to each other.

8. A projection lens system according to Claim 1, wherein a projection tube is used as said image generating source, and said sixth lens group comprises a lens having lens surfaces with the concave surface thereof facing the screen and negative refractive power, a liquid coolant for cooling said projection tube, and fluorescent face glass of said projection tube, and the center of curvature of said fluorescent face glass exists on the screen side.

9. A projection lens system for enlarging and displaying an original image displayed on an image generating source on a screen, comprising a first lens

group including at least one meniscus lens having positive refractive power in which the profile of the central area thereof is convex on the screen side, a second lens group including a lens having weak positive refractive power in which the profile of the central area thereof has a convex lens surface on the image generating source side, a third lens group including a lens having strong positive refractive power, a fourth lens group including a lens having negative refractive power and a concave lens surface on the screen side, a fifth lens group including a lens having weak refractive power in which the profile of the central area thereof has a convex lens surface on the image generating source side, and a sixth lens group including a lens having a concave lens surface on the screen side and negative refractive power sequentially from the screen side, wherein said system satisfies the following conditions:

$$0.24 < f0/f1 < 0.35,$$

$$0.0 < f0/f2 < 0.18,$$

$$0.78 < f0/f3 < 0.91,$$

$$-0.20 < f0/f4 < 0.0,$$

$$0.0 < f0/f5 < 0.21, \text{ and}$$

$$-0.61 < f0/f6 < -0.55$$

where f_0: Focal length of overall projection lens

system,

f_1: Focal length of first lens group,

f_2: Focal length of second lens group,

f_3: Focal length of third lens group,

f_4: Focal length of fourth lens group,

f_5: Focal length of fifth lens group, and

f_6: Focal length of sixth lens group.

10. A projection lens system according to Claim 9, wherein said first lens group and said second lens group have the following relation of an axial distance between surfaces of lens L 12 to a focal length f0 of the overall projection lens system:

$$(L\ 12\ /\ f0) < 0.25$$

11. A projection lens system according to Claim 9, wherein said first lens group, said second lens group, and said third lens group have the following relation between said axial distance between surfaces of lens L 12 of said first lens group and said second lens group and an axial distance between surfaces of lens L 23 of said second lens group and said third lens group:

$$(L\ 12\ /\ L\ 23) > 1.3$$

12. A projection lens system according to Claim 9, wherein said third lens group has the following relation between a radius of curvature Ra3 of the lens surface of a lens having strongest positive refractive

power on the screen side among the lenses thereof and a radius of curvature Rb3 of the lens surface on the image generating source side:

$$|Ra3| < |Rb3|$$

13. A projection lens system according to Claim 9, wherein said fourth lens group has the following relation between a radius of curvature Ra4 of the lens surface of a lens having strongest negative refractive power on the screen side among the lenses thereof and a radius of curvature Rb4 of the lens surface on the image generating source side:

$$|Ra4| < |Rb4|$$

14. A projection lens system according to Claim 13, wherein said fourth lens group uses a high dispersion material having an Abbe's number d of 45 or less as a material of said lens having strongest negative refractive power among the lenses thereof.

15. A projection lens system according to Claim 13, wherein a refractive index n3 of said lens having strongest positive refractive power among the lenses constituting said third lens group and a refractive index n4 of a lens closest to said third lens group among the lenses constituting said fourth lens group are almost equal to each other.

16. A projection lens system according to Claim 9,

wherein a projection tube is used as said image generating source, and said sixth lens group comprises a lens having lens surfaces with the concave surface thereof facing the screen and negative refractive power, a liquid coolant for cooling said projection tube, and fluorescent face glass of said projection tube, and the center of curvature of said fluorescent face glass exists on the screen side.

17. A projection lens system for enlarging and displaying an original image displayed on an image generating source on a screen, comprising a first lens group including a lens having a surface in which the central area thereof has a convex profile for the screen and the profile gradually changes to a concave profile toward the marginal area, a second lens group including a lens having a surface in which the central area thereof has a convex profile for the image generating source and the profile gradually changes to a concave profile toward the marginal area, a third lens group including a lens having positive refractive power, a fourth lens group including a lens having negative refractive power and a concave lens surface on the screen side, a fifth lens group including at least one lens having positive refractive power in which the central area thereof has a convex profile on

the image generating source side and the profile gradually changes to a concave profile toward the marginal area, and a sixth lens group including a lens having a concave lens surface on the screen side and negative refractive power sequentially from the screen side, wherein said system satisfies the following conditions:

$$0.24 < f0/f1 < 0.35,$$

$$0.0 < f0/f2 < 0.18,$$

$$0.78 < f0/f3 < 0.91,$$

$$-0.20 < f0/f4 < 0.0,$$

$$0.0 < f0/f5 < 0.21, \text{ and}$$

$$-0.61 < f0/f6 < -0.55$$

where f_0: Focal length of overall projection lens system,

f_1: Focal length of first lens group,

f_2: Focal length of second lens group,

f_3: Focal length of third lens group,

f_4: Focal length of fourth lens group,

f_5: Focal length of fifth lens group, and

f_6: Focal length of sixth lens group.

18. A projection lens system according to Claim 17, wherein said first lens group includes a lens having the following relation of the aspherical surface amount of the lens surface on the screen side

to the spherical surface amount:

$$(As/Ss) > -0.1$$

where As: aspherical sag amount, and

Ss: spherical sag amount.

19. A projection lens system according to Claim 17, wherein said fourth lens group includes a lens having the following relation of the aspherical surface amount of the lens surface on the image generating source side to the spherical surface amount:

$$(As/Ss) > -21.2$$

where As: aspherical sag amount, and

Ss: spherical sag amount.

20. A projection lens system according to Claim 17, wherein said fifth lens group includes a lens having the following relation of the aspherical surface amount of the lens surface on the image generating source side to the spherical surface amount:

$$(As/Ss) < -0.6$$

where As: aspherical sag amount, and

Ss: spherical sag amount.

21. A projection lens system according to Claim 17, wherein said sixth lens group includes a lens having the following relation of the aspherical

surface amount of the lens surface on the screen side to the spherical surface amount:

$$(As/Ss) < 1.1$$

where As: aspherical sag amount, and

Ss: spherical sag amount.

22. A projection lens system according to Claim 17, wherein said fourth lens group is structured so that the lens surface of a lens having strongest negative refractive power on the screen side among the lenses thereof has a concave lens profile on the screen side, and so that the central area of the lens surface on the image generating source side has a concave lens profile on the image generating source side, and so that the marginal area of the lens surface has a convex lens profile on the image generating source side and so that a radius of curvature Ra4 of the lens surface on the screen side and a radius of curvature Rb4 of the lens surface on the image generating source side have the following relation:

$$|Ra4| < |Rb4|$$

23. A projection lens system according to Claim 22, wherein said fourth lens group uses a high dispersion material having an Abbe's number d of 45 or less as a material of said lens having strongest

negative refractive power among the lenses thereof.

24. A projection lens system according to Claim 17, wherein a refractive index n3 of said lens having strongest positive refractive power among the lenses constituting said third lens group and a refractive index n4 of a lens closest to said third group among the lenses constituting said fourth lens group are almost equal to each other.

25. A projection lens system according to Claim 17, wherein said first lens group and said second lens group have the following relation of an axial distance between surfaces of lens L 12 to a focal length f0 of the overall projection lens system:

$$(L\ 12\ /\ f0) < 0.25$$

26. A projection lens system according to Claim 17, wherein said first lens group, said second lens group, and said third lens group have the following relation between said axial distance between surfaces of lens L 12 of said first lens group and said second lens group and an axial distance between surfaces of lens L 23 of said second lens group and said third lens group:

$$(L\ 12\ /\ L\ 23) > 1.3$$

27. A projection lens system according to Claim 17, wherein a projection tube is used as said image

generating source, and said sixth lens group comprises a lens having a concave surface on the screen side and negative refractive power, a liquid coolant for cooling said projection tube, and fluorescent face glass of said projection tube, and the center of curvature of said fluorescent face glass exists on the screen side.

28. A projection lens system according to Claim 17, wherein at least one surface of the lenses constituting said first lens group, said second lens group, said fourth lens group, said fifth lens group, and said sixth lens group is an aspherical surface.

29. A projection lens system according to Claim 28, wherein said first lens group includes a lens having the following relation of the aspherical surface amount of the lens surface on the screen side to the spherical surface amount:

$$(As/Ss) > -0.1$$

where As: aspherical sag amount, and

Ss: spherical sag amount.

30. A projection lens system according to Claim 28, wherein said fourth lens group includes a lens having the following relation of the aspherical surface amount of the lens surface on the image generating source side to the spherical surface

amount:

$$(As/Ss) > -21.2$$

where As: aspherical sag amount, and

Ss: spherical sag amount.

31. A projection lens system according to Claim 28, wherein said fifth lens group includes a lens having the following relation of the aspherical surface amount of the lens surface on the image generating source side to the spherical surface amount:

$$(As/Ss) < -0.6$$

where As: aspherical sag amount, and

Ss: spherical sag amount.

32. A projection lens system according to Claim 28, wherein said sixth lens group includes a lens having the following relation of the aspherical surface amount of the lens surface on the screen side to the spherical surface amount:

$$(As/Ss) < 1.1$$

where As: aspherical sag amount, and

Ss: spherical sag amount.

33. A projection lens system according to Claim 28, wherein said fourth lens group is structured so that the lens surface of a lens having strongest negative refractive power on the screen side among the

lenses thereof has a concave lens profile on the screen side, and so that the central area of the lens surface on the image generating source side has a concave lens profile on the image generating source side, and so that the marginal area of the lens surface has a convex lens profile on the image generating source side and so that a radius of curvature Ra4 of the lens surface on the screen side and so that a radius of curvature Rb4 of the lens surface on the image generating source side have the following relation:

$$|Ra4| < |Rb4|$$

34. A projection lens system according to Claim 33, wherein said fourth lens group uses a high dispersion material having an Abbe's number d of 45 or less as a material of said lens having strongest negative refractive power among the lenses thereof.

35. A projection lens system according to Claim 28, wherein a refractive index n3 of said lens having strongest positive refractive power among the lenses constituting said third lens group and a refractive index n4 of a lens closest to said third group among the lenses constituting said fourth lens group are almost equal to each other.

36. A projection lens system according to Claim

28, wherein said first lens group and said second lens group have the following relation of an axial distance between surfaces of lens L 12 to a focal length f0 of the overall projection lens system:

$$(L\ 12\ /\ f0) < 0.25$$

37. A projection lens system according to Claim 28, wherein said first lens group, said second lens group, and said third lens group have the following relation between said axial distance between surfaces of lens L 12 of said first lens group and said second lens group and an axial distance between surfaces of lens L 23 of said second lens group and said third lens group:

$$(L\ 12\ /\ L\ 23) > 1.3$$

38. A projection lens system according to Claim 28, wherein a projection tube is used as said image generating source, and said sixth lens group comprises a lens having a concave surface on the screen side and negative refractive power, a liquid coolant for cooling said projection tube, and fluorescent face glass of said projection tube, and the center of curvature of said fluorescent face glass exists on the screen side.

39. A projection lens system for enlarging and displaying an original image displayed on an image

generating source on a screen, comprising a lens (first lens) having positive refractive power, an aberration correction lens (second lens), and a lens (third lens) having a lens surface with the concave surface thereof facing the screen side and negative refractive power, wherein said third lens has a surface profile which is expressed by a function Z(r) of a distance (r) from the optical axis of said projection lens system and is symmetrical with said optical axis and said function has a point of inflection.

40. A projection lens system according to Claim 39, wherein said image generating source comprises a projection tube in which the center of curvature of fluorescent face glass exists on the screen side.

41. A projection lens system for enlarging and displaying an original image displayed on the fluorescent face of a projection tube on a screen, comprising a first lens group including a meniscus lens having positive refractive power in which the profile of the central area thereof is convex on the screen side, a second lens group including a lens having positive refractive power in which the profile of the central area thereof has a convex lens surface on the projection tube side, a third lens group

including a lens having positive refractive power, a fourth lens group including a lens having negative refractive power and a concave lens surface on the screen side, a fifth lens group including a lens having positive refractive power in which the profile of the central area thereof has a convex lens surface on the projection tube side, and a sixth lens group including a lens having a lens surfaces with the concave surface thereof facing the screen side and negative refractive power in which said lens surface on the screen side has a surface profile which is expressed by a function Z(r) of a distance (r) from the optical axis of said projection lens system and is symmetrical with said optical axis and said function has a point of inflection and having a liquid coolant for cooling said projection tube and fluorescent face glass of said projection tube sequentially from the screen side.

42. A projection lens system according to Claim 41, wherein said image generating source comprises the center of curvature of fluorescent face glass of said projection tube exists on the screen side.

43. A projection lens system for enlarging and displaying an original image displayed on an image generating source on a screen, comprising a lens

(first lens) having positive refractive power, an aberration correction lens (second lens), and a lens (third lens) having a concave lens surface on the screen side and negative refractive power, wherein said third lens has a surface profile which is expressed by a function Z(r) of a distance (r) from the optical axis of said projection lens system and is symmetrical with said optical axis, and the absolute value of a value obtained by substituting said distance from said optical axis in a second derivative obtained by differentiating said function quadratically changes with said distance from said optical axis, and said change is an increase in an area from the neighborhood of said optical axis to the central area and is a decrease in an area from the central area to the effective radius of lens.

44. A projection lens system according to Claim 43, wherein said image generating source comprises a projection tube in which the center of curvature of fluorescent face glass exists on the screen side.

45. A projection lens system for enlarging and displaying an original image displayed on the fluorescent face of a projection tube on a screen, comprising a first lens group including a meniscus lens having positive refractive power in which the

profile of the central area thereof is convex on the screen side, a second lens group including a lens having a lens surface in which the profile of the central area thereof is convex on the projection tube side, a third lens group including a lens having positive refractive power, a fourth lens group including a lens having negative refractive power and a concave lens surface on the screen side, a fifth lens group including a lens having positive refractive power in which the profile of the central area thereof has a convex lens surface on the projection tube side, and a sixth lens group including a lens having negative refractive power and a concave lens surface on the screen side which has a surface profile which is expressed by a function Z(r) of a distance (r) from the optical axis of said projection lens system and is symmetrical with said optical axis and is a profile that the absolute value of a value obtained by substituting said distance from said optical axis in a second derivative obtained by differentiating said function quadratically changes with said distance from said optical axis and said change is an increase in an area from the neighborhood of said optical axis to the central area and is a decrease in an area from the central area to the effective radius of lens and

having a liquid coolant for cooling said projection tube and fluorescent face glass of said projection tube sequentially from the screen side.

46. A projection lens system according to Claim 45, wherein the center of curvature of fluorescent face glass of said projection tube exists on the screen side.

47. A rear projection type image display apparatus including a projection lens system according to Claim 1 in front of said image generating source, wherein a transmission type screen is arranged on a focusing plane in front of said projection lens system.

48. A rear projection type image display apparatus according to Claim 47, wherein between a distance L (mm) from the lens surface of a lens positioned on the screen side among the lenses of said first lens group constituting said projection lens system on the screen side to said transmission type screen and a diagonal effective size M (inch) of said transmission type screen, the following relation is held:

$$17.3 < (L/M) < 17.6$$

49. A projection lens system for enlarging and displaying an original image displayed on an image generating source on a screen, wherein said projection

lens system comprises a plurality of lens elements, a lens element holding member for holding at least one lens element among said plurality of lens elements and covering the spaces among said lens element, and a connection member for connecting said lens holding member to said image generating source and also includes at least one communicating opening or communicating window connecting to the outside of said projection lens system from said spaces between said lens elements.

50. A projection lens system according to Claim 49, wherein in at least one space among said spaces between said lens elements, said communicating opening or communicating window is arranged individually in each of at least two leveling locations practically on the basis of the horizontal plane in the operation status of said projection lens system or continuously over said locations.

51. A projection lens system according to Claim 49, wherein at least one communicating opening or communicating window among said communicating openings or communicating windows is arranged as a space surrounded by at least said lens element holding member and said connection member around the connection point of said lens element holding member

and said connection member.

52. A projection lens system according to Claim 51, wherein said space surrounded by said lens element holding member and said connection member is structured so that the space volume thereof is restricted by the size of a protrusion provided in said lens element holding member or a protrusion provided in said connection member.

53. A projection lens system according to Claim 49, wherein at least one communicating opening or communicating window among said communicating openings or communicating windows is arranged in said lens element holding member.

54. A projection lens system according to Claim 49, wherein said lens element holding member comprises at least a first holding member for holding at least one lens element among said plurality of lens elements and a second holding member for fitting and holding said first holding member and at least one communicating opening or communicating window among said communicating openings or communicating windows is arranged between said first holding member and said second holding member of said lens element holding member.

55. A projection lens system according to Claim

54, wherein at least one groove provided in a concave shape on the inner side of said second holding member is said communicating opening or communicating window.

56. A projection lens system according to Claim 49, wherein at least one communicating opening or communicating window among said communicating openings or communicating windows is arranged around the periphery of said lens element.

57. A projection lens system according to Claim 49, wherein in at least one communicating opening or communicating window among said communicating openings or communicating windows, a dust-proof member is arranged in the opening portion thereof toward the outside of said projection lens system.

58. A projection lens system according to Claim 49, wherein at least one communicating opening or communicating window among said communicating openings or communicating windows has a bent, or curved, or twisted profile.

59. A projection lens system according to Claim 49, wherein said space between said lens elements to which at least one said communicating opening or communicating window is connected is a space between a lens element arranged closest to said image generating source and a lens element second closest to said image

generating source.

60. A projection lens system according to Claim 49, wherein a lens element arranged closest to said image generating source among said plurality of lens elements constitutes a lens group by combining a transparent medium on the image display surface of said image generating source and a transparent liquid filled up in a space between said lens element arranged closest to said image generating source and said transparent medium.

61. A projection lens system according to Claim 60, wherein said transparent medium on said image display surface of said image generating source is a face panel of a projection type cathode ray tube.

62. A rear projection type image display apparatus wherein a projection lens system according to Claim 49 is arranged in front of said image generating source and a transmission type screen is arranged on a focusing plane in front of said projection lens system.

63. A rear projection type image display apparatus according to Claim 62, wherein said image generating source is a projection type cathode ray tube.

64. A rear projection type image display

apparatus according to Claim 62, wherein said image generating source is a liquid crystal panel.